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The Thermogenic Centre in the Tuber Cinereum.

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The Thermogenic Centre in the Tuber Cinereum.

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IN 1885 I first published the statement that in the optic thalami were thermogenic centres. Afterward I more accurately located them in the tuber cinereum. These experiments have been confirmed by Baculo and contradicted by others. The contradiction, in some cases, can be explained by the use of dogs, which are unsuitable for this experiment. The original experiments were made upon rabbits, and they are the most suitable animals for experiments upon the thermogenic centres seated in the basal ganglia. In other cases, although the observer obtained a rise of temperature, yet he referred it not to an injury of the thalamus, but to irritation of its close neighbor,—the corpus striatum. I propose, in this short paper, to give a method by which the corpus striatum effect may be eliminated. In the same temperature and about the same time two rabbits, alike in size and general condition, were bound down on two Czermak rabbit-holders and etherized.

In both the carotids were ligated and the top of the skull removed. Then the brain was elevated by a narrow wooden spatula till I could, in both cases, see the optic commissure. In one the tuber was punctured by a probe two millimetres wide and one thick; in the other it was not. Then in both the brain was lowered into its place and covered with absorbent cotton. Their temperatures were taken before being bound down, and after the operations their temperatures were noted about every five minutes. Both animals were kept bound down on their abdomen. Great care was taken to keep the air-temperature steady. All the temperatures were taken with the same thermometer, and the animals were kept in as like condition as possible, except that one had its tuber cinereum punctured.

After the temperatures were noted, then the difference between the temperature before the operation and the highest afterward obtained was noted. Then the rise obtained in the one with the tuber only elevated, but not punctured, was deducted from the temperature-rise obtained in the one with the tuber punctured. This I call the actual gain of temperature due to puncture of the tuber cinereum. In one case, where the tuber was not punctured, the animal had a fall of temperature (Series 2), which, perhaps, should be added to the rise in the punctured animal; but I have not done so, and have taken the rise as the actual gain of temperature.

Then the actual increases of temperature due to puncture of the tuber cinereum are as follow: 3.2° , 0.4° , 1° , 2.6° , 4.4° , and 1.4° F.

It seems to me that these actual gains of

temperature should leave no doubt but that, in the puncture of the tuber cinereum, we have a rise of temperature. Now, in my papers, I have shown that a puncture in this region is not only accompanied by a rise of temperature, but a rise due to increased production of heat.* What I have denominated there as Schiff's crying-centre in rabbits is seated in the tuber cinereum, and is simply a point which causes a prolonged expiration accompanied with a peculiar, shrill cry, and, when this cry takes place I have invariably found a rise of temperature. These experiments demonstrate that the tuber cinereum contains a thermogenic centre, and that the puncture made into it causes a rise of temperature which is not wholly due to an irritation of the neighboring body,—the corpus striatum,—and that this rise of temperature is caused by an increased heat production. Therefore, the tuber cinereum is a thermogenic centre.

Following are some of the experiments made upon this point:—

SERIES I. Air temperature, 88.

Rabbit.		Rabbit.	
Time, P.M.	R. T.	Time, P.M.	R. T.
4.03	104	4.50	104.6
4.07	Optic chiasm torn.	4.55	Tuber cinereum elevated, but not punctured.
4.08	105.8	5.00	105.1
4.15	106.2	5.08	104.9
4.22	106.7	5.15	104.9
4.28	107.4	5.30	104.9
4.34	107.7	5.39	104.6
4.44	103	5.48	104.6
	+3.7° F.		+0.5° F.
Actual gain, 3 2° F.			

* Therapeutic Gazette, Nos. 16 and 17, 1887.

SERIES 2. Air temperature, 80.

Rabbit.		Rabbit.	
Time, P.M.	R. T.	Time, P.M.	R. T.
5 00	104.1	5.25	101.1
Tuber cinereum		5 30	Tuber elevated,
punctured.			but not punct.
5 08	104.5	5.35	100.6
5 35	103.6	5 50	100.6
5 45	103.5	6 00	100.6
6 15	102.6	6.10	101
		6.23	101

+0.4° F.

—0.5° F.

Actual gain, 0.4° F.

SERIES 3. Air temperature, 89.

Rabbit.		Rabbit.	
Time, P.M.	R. T.	Time, P.M.	R. T.
4 00	103	4.00	104
4.10	Tuber		Tuber elevated.
	punctured.		
4 25	102.5	4 45	104.2
4 30	102.5	4.55	104
4 40	102.5	5 05	104
4.50	104.2	5 15	103.5
5.00	104	5 25	103.5
5.10	102.5		

+1.2° F.

+0.2° F.

Actual gain, 1° F.

SERIES 4. Air temperature, 96.

Rabbit.		Rabbit.	
Time, A.M.	R. T.	Time, A.M.	R. T.
10.00	103	10.05	102.5
10.05	Tuber	10.10	Tuber
	elevated.		punctured.
10.25	105.5	10.35	103.2
10 35	104.5	10 40	104.2
10 45	104.2	10 50	104.6
10.55	104.2	10.57	105.2
11.10	104.4	11 05	105.6
11.20	104.9	11.15	106.3
11.30	104.0	11 25	107.0
		11.30	106.5

+1.9° F.

+4.5° F.

Actual gain, 2.6° F.

SERIES 5. Air temperature, 92.

Rabbit.		Rabbit.	
Time, P.M.	R. T.	Time, P.M.	R. T.
3 30	104.2	3 30	104.5
3 35	Tuber	3 40	Tuber
	punctured.		elevated.
3 45	105.0	3 53	105.5
3 55	105.5	4.00	105.5
4 00	105.5	4.10	105.5
4 05	106.0	4.30	105.3
4 15	106.5	4 40	105.3
4 25	107	4.55	105.1
4 35	107.5		
4 40	108.8		
4 55	109.0		
5 20	109.5		
5 45	109.1		
	+5.5° F.		+1.1° F.
Actual gain, 4.4° F.			

SERIES 6. Air temperature, 96.

Rabbit.		Rabbit.	
Time, P.M.	R. T.	Time, P.M.	R. T.
1.20	103.5	1.10	102.4
1.25	Tuber	1.15	Tuber
	elevated.		punctured.
1.30	104.5	1 18	102.6
1.40	105	1.25	102.2
1.50	104.7	1.35	103.2
		1 45	105
		1.55	103.6
	+1.2° F.		+2.6° F.
Actual gain, 1.4° F.			

